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REPORT  
ON THE  
OYSTER FISHERIES  
OF  
CANADA  
1892

BY  
MR. ERNEST KEMP  
*Oyster Expert.*



OTTAWA  
PRINTED BY A. E. DAWSON, PRINTER TO THE QUEEN'S MOST  
EXCELLENT MAJESTY

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[No. 106—1892.]

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# REPORT

ON

## THE OYSTER FISHERY OF CANADA.

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OTTAWA, 31st December, 1892.

To the Honourable CHARLES H. TUPPER,  
Minister of Marine and Fisheries,  
Ottawa.

SIR,—I have the honour to inclose my report on the Oyster Fishery of Canada for the portion of the year 1892 during which I was engaged in the work of examining the oyster beds in the Maritime Provinces.

Having received an intimation from the High Commissioner for Canada, that it was the desire of the Dominion Government that two English Experts in Oyster-culture should proceed to Canada, as early as possible in the spring of this year, for the purpose of examining the several oyster-beds in the Dominion, and inquiring into, and reporting upon, the best modes of preserving and developing this valuable industry, my father Mr. Frederick Kemp and myself left England on the 24th May, 1892, reaching Halifax on the following 4th June.

On our arrival there, we were met by Mr. C. A. Hutchins, Inspector of Lights, Marine and Fisheries Department, who instructed us to proceed to Shediac, which we immediately did.

### GENERAL REMARKS ON THE RESULTS OF OYSTER-CULTURE IN FRANCE AND ENGLAND.

Before entering into the body of this report, I deem it advisable, with your permission, to preface it with some general remarks on oyster-culture, and the high state of protection it has attained in France as well as in England. In a country where methods, so successfully pursued, and the advantageous pecuniary results so speedily and surely realized, are comparatively unknown, a few data bearing on these points cannot fail to be of interest to parties who may wish to engage in so profitable a business.

Indeed, during my short stay of a little over six months in New Brunswick and Prince Edward Island, I have found, among the people there, an evident desire to learn everything relating to the culture of oysters, and I have no doubt that with the material assistance which your department is prepared to give, to those willing to embark in this business, the day is not far distant when the whole coast of New Brunswick from Caraquette to Bay Verte and the shores of Prince Edward Island, as well as a great many places in Nova Scotia could be made to yield a handsome revenue to the Provinces, while being of no small importance to parties desiring to engage into this lucrative trade.

My intimate connection with the Whitstable Oyster Company, of which I am a member, and where I have gained most of my practical knowledge and experience, will enable me to bring to your notice a few facts connected with the inception, the development and the present standing of the above-named concern.

The exact date of the formation of this company is not known, oysters having been found on these shores from time immemorial; a record of the members who owned the above company is to be seen in the museum at Whitstable, dated about 1660, consisting of about twenty members. This ground as an oyster fishery they found to be very valuable, but labour being very scarce at the time, these members allowed the labouring men to take an equal proportion of the dividend and finally allowed them to remain as members.

In 1793, an Act of Parliament was obtained incorporating the company of Free Fishers and Dredgers of Whitstable and granting them the Common Seal. Since that year, the company has regularly held each July its water court, presided over by a steward. On that day all its officers are elected for the following year. Only freemen are allowed to attend meetings, or fish on these grounds, a rule rigidly enforced.

The oyster-beds are about one and a half square miles in size, but the company hold land and freehold to a great extent.

From two to three hundred men find employment in the oyster fishery nearly the whole of the year. The total number of members at the present time belonging to the company is 550, the annual turnover being about £70,000, and the total value of the whole concern is estimated at about £200,000 sterling.

Their grounds are always kept well supplied with stock, consisting of marketable and young oysters, which are either bred on their own grounds or purchased from the surrounding oyster grounds adjoining them.

No artificial means have been used at Whitstable, on account of the exposed position of the beds to the sea. At times very large sums of money have been paid for brood for the re-stocking of their grounds. Some of this brood comes from Essex, a distance of about twenty miles. On these shores they have been more successful in saving the spat which falls in their rivers. These grounds are well sheltered and protected from the sea, being nearly all land-locked.

The price of this brood has gradually been on the increase. For instance, oysters were purchased by my father in the year 1860, for the Whitstable Oyster Company, 112 tubs of oysters (24 gallons to the tub) at six shillings per tub, total value £33 12s. Since his return from Canada, after this inspection, he has bought the same quality and quantity for the above company, paying for the same £15 per tub, or a total value of £1,680, thus showing the care and interest taken to preserve so valuable an industry.

Until about the year 1875 no French brood or oysters were laid on English oyster grounds, but owing to the scarcity of spat, falling in English waters, on account of successive cold seasons, which has caused a steady decrease of oysters round the British coast, we have to thank our French neighbours for the success they have been so fortunate in obtaining large quantities of oysters by artificial means, where they are enjoying a milder climate, have crowned their labours with success, and are now enabled to furnish the English markets with whatever supplies that are needed. Larger quantities of oysters are imported from France each year, and before I left England our company alone laid on their grounds 20,000,000 of French oysters to enable them to supply the demands of the trade on the following season, with a good second quality oyster.

In dredging, the whole of the oysters, as they are hauled on board, are carefully examined and selected, all below a certain size are returned to the water on a bed expressly reserved for them, until they have grown sufficiently large enough for market.

The company are most particular with their beds, great care being taken not to disturb or destroy the soil; a vessel is not allowed to anchor on the grounds, they being guarded by three watchboats with crews for night and day work; a rake is not even allowed to be used, under any consideration, under a penalty of £10; and in the year 1887 a vessel named the "Resolute" of about 350 tons burden, through an error in the captain's judgment, ran aground on the beds and remained there for eight hours; although this vessel was owned by members of the above company, yet the matter was compromised by payment of £150 for damages, instead of allowing the case to be settled by law, thus showing the value and the care that is bestowed on these beds. Other companies are just as particular in their care and preservation of their beds.

This work is carried on year after year by those connected with oyster grounds, much the same as a farmer who attends to his farm and crops, and with his labour and exertion is looking in the future for favourable results.

The French Government, finding their grounds becoming depleted through over-fishing, realized how necessary it was to interfere to save the entire industry, and laws were passed regulating stringently how and when the few remaining oysters might be dredged. More important still, the agitation of these measures led to the question of replenishment as the important problem.

The reservation of the natural grounds as State property, and the forbidding of general public dredging, is generally regarded as the keystone of French oyster-culture. These grounds once exhausted, and now flourishing, are regarded as the permanent capital of surrounding areas, whose profits in the form of seed oysters are shared by all alike.

The State exercises the additional right of surveillance in the interests of culturists, through the local commissaries of marine, and of regulating and changing the terms of State rentals.

The industry is a profitable one to the culturist. It also returns to the State a large yearly revenue by way of rentals. Competition, moreover, on the side of the culturists, is operating more and more favourably for the people, insuring a product for general consumption.

#### REPORT ON THE WORK IN NEW BRUNSWICK.

On our arrival at Shediac we were met by Mr. R. A. Chapman, Inspector of Fisheries for New Brunswick, and Mr. E. Hackett, Inspector of Fisheries for Prince Edward Island.

Our instructions were to visit the following places, viz., Shediac, Buctouche, Cocagne and Richibucto.

##### SHEDIAC.

Having carefully and thoroughly surveyed, dredged and inspected the whole of Shediac Bay, I am convinced that it is a most suitable place for natural oyster-culture. Upon every clear place where any soil can be found have dredged up oysters and oyster brood, as many as 20 at a haul. These beds are in a most deplorable condition through neglect and want of proper care and attention, also the ruthless manner in which the mussel-mud diggers have cut the beds to pieces, and they are now a lot of disjointed patches with an immense accumulation of soft mud around them. It was four days before we succeeded in finding a piece of ground large enough to cultivate oysters upon. Since then we were more successful and have found more suitable and larger portions of ground which have been marked by placing a number of beacons around the same. One of the best pieces of ground is off or abreast of Mr. Hannington's house; it can be very much enlarged by using proper means, there being good ground around and lying in a good depth of water.

There are also other beds which can be connected by time, care and labour. Upon examination of the soil, it was found that the northern portion of the ground, on the plan handed to us, was entirely useless for oyster-culture, but large quantities of ground were found south of the southern boundary of the plan, suitable for the above purpose; the bearings and limits of the ground most suitable have been marked on an Admiralty chart and forwarded to the department.

These grounds when properly cleaned and kept in order will be very valuable both for breeding and maturing the oyster.

To make these beds successful, they must be thoroughly cleansed by dredges as used in England, these instruments always improve and enlarge the same, and will also bring up oysters at any depth of water. I am certain that when the dredge is once introduced in the Dominion it will supersede the rake and open a new feature in the oyster industry.



This ground at present is not in a fit condition to plant oysters upon.

These beds having never been properly worked or kept clean are very dirty, with large quantities of eel grass growing on and around them, also an accumulation of mud, which has been deposited there by the tides; but with time and labour these can all be cleaned and put in working order. Small quantities of oysters and brood, are to be found on these beds, showing that oysters are still in existence in this locality, which are of an excellent quality.

At BUCTOUCHE and COCAGNE, the grounds were found to be very much disjointed through the mud diggers (with the exception of the Dixon bed). We also proceeded up the river beyond the railway bridge, as far as the oyster-beds extend, and found it in the same condition as below, cut to pieces and disjointed. These patches generally showed a very healthy condition. We cannot find ground with a sufficient depth of water to reserve for the cultivation of oysters in the river or bay. The oysters here are to be found growing on the sides of banks and edges of the channels, being very healthy, growing very fast and a much greater proportion of oyster brood than the full-grown oyster: in one haul we brought up 10 oysters and 54 brood, in another haul 43 brood no oysters, and many hauls in like proportion. Fishing oysters through the ice was very noticeable here, as in some places, bleached shells were found, caused through being exposed to the weather, and the young brood all dead.

At RICHIBUCTO we found like the two former places, with the addition of a much larger quantity of oyster brood; on every place which was dredged, were found an abundance of the same in the healthiest condition, no mortality whatever, everything brought up by the dredge proved to be oyster brood; a sight like this could not be seen on any oyster grounds in England. The patches are small, owing to the operations of the mussel-mud diggers, all the surroundings being composed of long eel grass and soft mud. Were it possible to form ground sufficiently hard to receive the spat there could (from Big Cove to Kingston Bridge) be saved a sufficient quantity of oyster brood to supply the whole of England's oyster-beds. On every patch dredged our hauls of oyster brood were as follows: 163, 105, 195, 108. Coming to a larger patch from which we were enabled to obtain a greater quantity we brought up 811; the largest portion consisted of undersized oysters.

No soil was found for the spat to adhere to, consequently great numbers were smothered and destroyed by the mud.

The North-west River was next inspected, where very few oysters were found and the ground appeared to be very old, having been destroyed by the mud diggers, and had the appearance of being long disused.

The best and most suitable piece of ground lay between Indian Island and the main land, a portion of which was comparatively clean, but the greatest portion would require cleaning before planting, there being in this place a substantial bottom; the only drawback which I noticed was the situation, being opposite the Indian settlement and might be robbed by them.

#### THE WORK IN PRINCE EDWARD ISLAND.

The places visited were Summerside Harbour, or Bedeque Bay, Richmond Bay, Narrows, Bideford, Enmore River, Charlottetown, North or York River, West River and Vernon River.

##### BEDEQUE BAY.

The greater portion of this bay consists of soft mud and long eel grass; most of the once famous beds have suffered the effects of mud digging.

Off Oyster Point the bottom is very firm, but owing to the grass and weed being so thick, it was impossible to tell what the bottom was really like; at one time large quantities of oysters were shipped from this locality.

Apart from this there appears to be only one available place for the culture of oysters, situated off the North Shore, towards Wilnot Creek; some portion of the

ground was clear, but the greater portion was covered with weed and short grass, the bottom being very firm. The oysters and brood brought up were of a very fine quality and in a healthy condition, growing very fast. This piece, I have no doubt, would be the most suitable piece for restocking after it has been properly cleaned.

#### RICHMOND BAY.

This ground covers a very extensive area, and find the same nothing short of a gold mine; these grounds appear to be very prolific. Some of these beds are very large, consisting of many acres, the stock upon them comparing well with cultivated grounds; the resources appear to be enormous, for the beds are well stocked with oysters and oyster brood, which we find of a very good quality, and in a healthy condition, growing very rapidly.

Every part inspected where soil is to be found there are oysters and oyster brood. In no single instance have we seen any death, or a marine enemy to the oyster, a most remarkable coincidence over such an area of ground. I submit to you some of the hauls that were made over different parts of the bay: Old Store haul, 37 oysters, 80 brood; 38 oysters, 48 brood; 24 oysters, 38 brood; 20 oysters, 13 brood. Four hauls off south side of Gull Point: first haul, 124 brood, 38 oysters; second haul, 43 oysters; third haul, 20 oysters, 18 brood; fourth haul, 35 oysters, 33 brood. Curtain Island, Malpeque Bay: first haul, 59 oysters, 35 brood; second haul, 40 oysters, 14 brood; third haul, 50 oysters, 21 brood; fourth haul, 38 oysters, 13 brood. From south-west to north-west of Curtain Island reef: first haul, 75 oysters, 18 brood; second haul, 90 oysters, 6 brood. In the middle of the bay we had 64 large oysters and 16 brood in one haul. East end of the Gull Point: first haul, 47 oysters, 155 brood; second haul, 58 oysters, 180 brood. Off Archie Camel's shore, 43 oysters, 23 brood; second haul, 79 oysters, 98 brood; third haul, 64 oysters, 91 brood. Archie Camel's Cape: first haul, 73 oysters, 54 brood; second haul, 89 oysters, 50 brood. Sam's Island, an old bed, 1 oyster, 14 brood. Off Mill's Point west: first haul, 20 oysters, 5 brood; second haul, 6 oysters, 4 brood. McNeil's Point: first haul, 75 oysters, 38 brood; second haul, 39 oysters, 30 brood; third haul, 39 oysters, 36 brood. Lock Shore: first haul, 36 oysters, 28 brood; second haul, 43 oysters, 20 brood. Off River Platt: first haul, 9 oysters, 3 brood; second haul, 21 oysters, 3 brood. Fraser's Cove: first haul, 23 oysters, 7 brood; second haul, 20 oysters, 15 brood; third haul, 16 oysters, 20 brood. The above figures will point out the present state of the grounds, so that from time to time you may be enabled to test the various beds and compare notes. The grounds from Oyster Cove, including Indian River to Rayner's Creek, has been entirely destroyed by mussel-mud digging. Warden Kelly, of Travellers' Rest, informed us that these were originally some of the best beds in the whole bay; the fishermen were able to fish in all weathers here, as they were in such a sheltered position. These beds extended about four miles in length. The whole of this bay is well sheltered from the sea, it being nearly all surrounded by land.

#### NARROWS AND BIDEFORD.

These places were found to be in the same flourishing condition as Richmond Bay. The oysters here were found to be smaller in size and round in shape, with a deep bottom shell, resembling the English oyster more than anything previously seen, they were well fished, and of delicate flavour.

I will give some of the numbers of oysters taken at different places by the dredge. Middle of Narrows: first haul, 54 oysters, 48 brood; second haul, 60 oysters, 65 brood; third haul, 34 oysters, 54 brood; fourth haul, 35 oysters, 90 brood; fifth haul, 10 oysters, 50 brood. Richard's bed north side of Squirrel Creek: first haul, 53 oysters, 35 brood; second haul, 51 oysters, 38 brood; third haul, 29 oysters, 13 brood; fourth haul, 49 oysters, 10 brood; fifth haul, 55 oysters, 58 brood; sixth haul, 17 oysters, 47 brood. Nigger Point: first haul, 16 oysters, 38 brood; second haul, 30 oysters, 32



brood. Joe Benard's Point, Lennox Island: first haul, 18 oysters, 72 brood; second haul, 36 oysters, 59 brood. Sally Frances bed: first haul, 25 oysters, 38 brood; second haul, 37 oysters, 76 brood. Cooper's bed: first haul, 15 oysters, 222 brood; second haul, 22 oysters, 160 brood. Bideford River: first haul, 14 oysters, 35 brood; second haul, 19 oysters, 21 brood; third haul, 14 oysters, 28 brood. Schooner's Creek was found to be cut up with mud diggers: first haul, 9 oysters, 33 brood; second haul, 9 oysters, 26 brood; third haul, 1 oyster, 1 brood. Barkley's Creek: first haul, 6 oysters, 23 brood; second haul, 8 oysters, 34 brood. Trout River: first haul, 10 oysters, 47 brood; second haul, 2 oysters, 29 brood; third haul, 22 oysters, 68 brood; large mussels were found in Trout River. Lot 12, Point: first haul, 23 oysters, 33 brood; second haul, 13 oysters, 13 brood. Bird Island: first haul, 68 oysters, 47 brood; second haul, 37 oysters, 27 brood; these oysters were very fine.

## ENMORE RIVER.

Owing to the unsettled weather, and small boat, we were unable to find any ground suitable to reserve for oyster culture. The warden informed us, that originally there was a bed extending for half a mile in length, but had been destroyed by mud diggers, so that no oysters or ground can now be found. The first haul we had consisted of 5 oysters, 1 brood; second haul, 1 oyster, 8 brood; third haul, 5 oysters, 2 brood; fourth haul, 3 oysters, 3 brood; fifth haul, 6 oysters; sixth haul, 2 oysters, 2 brood; seventh haul, 1 oyster.

## CHARLOTTETOWN.

In the North River we found very little soil or oyster ground, the greatest portion consisting of long grass and mud, but were informed there were oysters above the bridge. We were unable to go beyond the same in the steam launch.

*West River.*—In Long Creek we found an abundance of oyster brood in a healthy condition and growing very fast; the oyster-bed extended nearly half a mile in length. Our hauls were as follows, (but at no time was the dredge full, as our dredging had to be done in a rowing boat): first haul, 4 oysters, 32 brood; second haul, 11 oysters, 81 brood; third haul, 10 oysters, 236 brood; fourth haul, 20 oysters, 222 brood. After finishing dredging in Long Creek, we landed on the point at half tide, our attention being called to the same; we there also found a large quantity of brood, which dried at every ebb tide. Clyde River we found: first haul, 17 oysters, 110 brood; second haul, 17 oysters, 120 brood; third haul, 24 oysters, 128 brood.

*Vernon River.*—First haul, 15 oysters, 151 brood; second haul, 18 oysters, 163 brood; third haul, 7 oysters, 300 brood. A large quantity of weed and mud exist in all these rivers. Mr. John Finlay informed us that the grounds in Orwell Bay and Orwell Cove would compare well with the grounds already dredged upon the Vernon River.

*East River.*—Through the courtesy of John MacEachern, Esq., who drove us over to Red Point down to the water's edge at low tide, along the shore from point to point, where we were enabled to see sights worth looking at; the ground being completely covered with oyster brood of a very fine shape and form, very different to the oysters we have seen on the other beds this part of the island. Mr. MacEachern informed us that a continuation of this brood was to be found on every point for ten or fifteen miles along the river. Individuals who have leased oyster grounds, would do well to restock their beds by picking this brood, and planting their beds with the same. As a rule oyster brood picked upon an ebb dry ground, are much hardier than those taken in deep water.

## THE WORK IN NOVA SCOTIA.

## TRACADIE :—ANTIGONISH COUNTY.

The harbour here is divided into two arms called the East and West Arm. In the East Arm I find a large space of water, well protected from the sea, there being only a narrow outlet at the north-east corner.

This harbour is deep ; in the middle it is chiefly composed of soft mud and eel grass, but towards the shore the bottom becomes firmer, and portions of this could be converted into oyster-beds by placing a large quantity of culch as a foundation for the beds, also for the spat to adhere to, after the oysters have been planted.

The most suitable places here are on the north-west side, there is a cove with firm bottom, and along the north shore it is open for a short distance from the land. A considerable piece of ground may be found along the east side of the harbour, nearly half a mile in length, running out gradually to a depth of about 10 feet water.

There are also two narrow channels on the south-east part of the harbour, close to Mr. Girrior's house, where the bottom is firm and could be made available. In this harbour I found no oysters, although I have been informed oysters have been taken from here.

The West Arm I found to be well sheltered and protected from the disturbance of the sea, as it is entirely land-locked, and is in every way adapted for oysters to flourish here. The bottom is firm, consisting of shells, stones and mud, the oysters are very healthy and well fished, growing in every part of this arm ; oysters are found here of every size ; and I have been informed by the fishermen and others in the locality, that oysters are increasing in numbers, large quantities being taken from this part of the harbour each year. The inhabitants are satisfied with what they are catching, and do not wish to be interfered with, as some of the men depend upon the oysters they catch as their harvest of the year. I find many undersized oysters are landed here, which greatly checks the numbers which might be found, were the oyster brood left to grow until fit to be taken to market.

In this spacious harbour the depth of water is found to vary from the sides to the centre from 2 to 10 feet, the bottom is even, there being no mud digging going on in this locality. The farmers here collect the kelp or seaweed from the shores, which they find very beneficial to their land.

Here I noticed some oysters were taken from a firm bottom, while others were found amongst the mud ; the former were of a much superior class, both the shell and the oyster being very firm and white in colour, while the latter, the shells were found to be soft, and inferior in fish as regards colour and flavour. This shows that a firm bottom is preferable.

I should suggest that this harbour be equally divided into two portions for the fishing of oysters, to be carried on alternately in each division ; fishing on one half of the harbour one year, and the other half the next year. This is a splendid natural oyster-bed, the grounds being an excellent place for the spawn to fall without being disturbed by the motion of the sea.

## THE FALL WORK AT SHEDIAC.

On the conclusion of the above inspection my time has been devoted to preparing the oyster-beds at Shediac harbour for the purpose of restocking them in the spring. I have been dredging on one of the largest beds, by means of a small steam-boat, working four dredges, thus removing all the old shells, weed and refuse which covered these beds, being very careful to pick out all live oysters and brood which were brought to the

surface; these have been again relaid on different parts of the harbour, after having been carefully separated from the shells or oysters they have adhered to; this is done so that the shape of the oyster may develop more fully. The cultch and shells which accumulated on these beds have been removed from the top, and placed on the mud on the outside edges, or in some of the holes caused by the mud diggers; and having had an opportunity of seeing the bottom before I closed the work, I am pleased to state that the ground has been cleaned on the edges, making the bed very much larger than I had previously anticipated, and the soil is clean on the portion where I have been engaged, and is now ready for restocking with oyster brood.

I have tried on other parts of the bay which I find dirty, but can also state there has been a small quantity of spat fall during this last summer.

After these grounds have been stocked a large quantity of clean oyster shells will be necessary to be had in readiness to lay on the grounds to endeavour to catch the spat. The time cannot always be strictly depended upon, as it entirely depends upon the state of the weather and the temperature of the water.

No oysters have been planted in Shediac this fall, although I had made arrangements with Mr. MacEachern, of Charlottetown, P.E.I.; when I was ready for them I wrote him, and from some cause or other the letter was delayed in reaching him, when it was found this gentleman was too ill to attend to same. Mr. Lord also wrote me on the subject, stating I had better come over and make other arrangements, if I wished for any oysters to be planted this season; through this delay the season became so far advanced, frost and snow having set in by this time, I deemed it prudent not to lay anything down, as the exposure of the oysters taken from the water to the frosty atmosphere, the change of water, the temperature falling each day, and the risk of oysters lying on the ground the whole of the winter, the loss would undoubtedly be great.

Young oysters taken in the spring will have survived the winter, the change of water and temperature becoming warmer, gives the oyster every chance to live and grow.

#### GENERAL REMARKS AND RECOMMENDATIONS.

The oyster fishery in Canada can be largely developed, and I would advise that the following restrictions be placed on all oyster grounds, as these will become more valuable every year.

1. Boats engaged in the oyster fishery should be duly licensed, registered and numbered with the respective ports to which they belong, having a number painted in large figures on the boat as well as her name, in the same manner as is done in the United Kingdom, France, Belgium, Holland and other European countries. The above system answers admirably and most effectually in British and continental waters. It seems to be an excellent way of preserving this and other fishing industries.

2. Licenses might be granted to oyster fishermen; each license having a list of rules printed at the foot, such as: No *round* oysters to be landed under two inches in diameter, or *long* oysters under three inches in length, under penalty of a fine for each offence. The rule would apply only to localities where the above size could be defined, as sizes vary according to different waters, but the above rule would apply to all places visited by me and mentioned in this report.

3. No fishing for oysters to be allowed on Sunday, nor at any time during the close season.

4. The number of each fishing boat to correspond with the license held by them.

With the assistance of the above rules, a record of boats and men could be kept, showing the number of people engaged in this industry, and whether it prospered or not. It would also be useful to fishery officers, for the purpose of detecting boats poaching during the close season, or fishing on licensed or reserved grounds.

#### OYSTER FISHING IN WINTER.

The fishing of oysters through the ice having been stopped by Order-in-Council, I have no doubt such a measure will go a very long way towards protecting and preserving the

beds. Where this practice has been carried on, as has previously been done on most beds, heaps of refuse, consisting of dead shells and mud are found; large numbers of dead young oyster shells are also found bleached by exposure; the loss of oysters in this way must have been enormous. Where the ice does not actually rest on the beds it has the practical effect of protecting the oysters from changes in the temperature. This has proved to be the case in Ostend, Belgium, where the oyster parcs happened to freeze over. Originally they were always breaking the ice, thinking it might hurt the oyster to be frozen over, but they suffered great mortality; upon being advised to let the ice remain they found scarcely any death among them, and have since that time always allowed their parcs to freeze.

#### MUSSEL-MUD DIGGING.

The machines used in mud digging have proved to be very destructive to oyster grounds, and their injurious effect is noticeable on nearly every bed I have visited.

At Shediac, the grounds have suffered very much from the effects of the mussel-mud digger; these machines having been working on the best portions of oyster-beds for years past. I was informed by Mr. Charles Hannington, C.E., of Old Shediac, that in the year 1885, no less than thirty-seven of these machines were at work on the ice at one time on these beds.

It is estimated by experienced men that one of these machines will destroy an eighth of an acre in one winter. They will dig holes or trenches right through the entire length of an oyster-bed, to a depth of 20 to 25 feet, and about 6 to 9 feet in width. These holes will fill up in course of time with soft mud, and it is very difficult to lay a foundation on such a soil, to restore the beds to their original shape. It can thus be seen where the oyster-beds have gone to.

Oyster-beds can never be cultivated where the mud digger is allowed to work, and considering how these grounds have suffered by being more contracted each year, it would be advisable to prohibit mussel digging altogether.

#### PREPARATION OF GROUNDS.

Oysters cannot thrive where the ground is composed of moving sand, or where mud is deposited; consequently, since the size and number of these places are becoming very limited, only a very small percentage of the young oysters can find a resting place, and the remainder perish. By putting down suitable cultch immense quantities of the wandering spat (or fry) may settle on it, and thus be saved. As a rule, the natural beds occupy most of the suitable space in their own vicinity. Unoccupied ground may, however, be prepared for the reception of new beds, by spreading sand, gravel and shells over muddy bottoms, or beds may be kept up in locations for permanent, natural beds, by putting down oysters and cultch, just before the time of breeding, thus giving the spat a chance to fix themselves before the currents and enemies have had time to destroy them.

The simplest form of oyster-culture is the preservation of the natural oyster-beds. Upon this, in fact, depends the whole future of the industry, since it is not probable that any system of artificial breeding can be devised on these shores, on account of protecting the seed during the long winter, which will render it possible to keep up a supply, without at least occasional recourse to seed oysters produced under natural conditions. It is the opinion of almost all who have studied the subject, that any natural bed may in time be destroyed by over-fishing, by burying the breeding oysters, by covering up the projections suitable for the reception of spat, and by breaking down, through the action of heavy dredges, the ridges which are specially fitted to receive the future spats.

Professor Huxley quotes: "As regards the future of the oyster industry in Great Britain, and are doubtless just as applicable to other countries, that the only hope for the oyster consumer, lies in the encouragement of oyster-culture, and in the development of some means of breeding oysters under such conditions that the spat shall be safely deposited."

## OYSTER FOOD.

In discussing the question of oyster food in its many aspects, the general character should first be examined. The oyster, it is well known, is quite an epicure in its feeding, preying almost entirely upon the minute, lowly organized plants that float or swim in its neighbourhood. With its shell slightly opened, and with the dark coloured sensory margins of its mantle protruding, it draws into its shell a narrowing food-bearing water current. When it once draws in the current, it carefully screens out the minute food particles, and passes out a stream of filtered water. It avoids if possible ingesting sand or mud. Oyster food, it will be found, consists mainly of diatoms, a particular kind of minute, lowly organized plant that have the remarkable power of moving freely about in the water. Unlike any other plant they are incased in a pair of saucer-like glassy shells, fitted one to the other like the lid to a pill box. The glassy cases of the minute plants appear in no way to inconvenience the oyster's digestion. The mucilaginous sheathing that encases prominently many diatoms, is first dissolved, and the digestive juices find their way through the intricate glassy valves, speedily attacking and reducing the jelly-like contents, together with the inclosed golden-brown pigment pellets. The emptied diatoms appear to settle gradually, and are soon brushed by countless cilia from the stomach to the intestine.

## TEMPERATURE.

During my inspection the temperature of the water has been closely watched, and it has been found to be very even throughout the whole of the waters. There is no reason why there should not be a spat fall each year if the grounds are in a fit condition to receive the same; and with careful attention, I do not see why these grounds after restocking should not be as prolific as they originally were.

## TRANSPLANTING OYSTERS.

The removal of oysters from one ground to another has the general effect of improving both their flavour and size. The spring of the year is the best time for planting. By placing the oysters in shallow water during the spring and summer months, they will grow much faster than if placed in deeper water, as the sun causes the water to become much warmer, the oyster being very sensitive to the action of light and heat, which promotes a rapid growth. Oysters planted in the autumn are not so likely to thrive, as owing to the change of soil and falling temperature, the oyster is not properly climatized before winter sets in, which very often proves disastrous. Oysters grow but very little during the winter months, consequently it is all risk and loss with no gain, although there are exceptions in every case.

## CLOSE SEASON.

The close season is at present from 1st June to 15th September; while this is against the reserved notion that no oysters should be eaten during the months without an R, I think the dates are well chosen. In Ireland, the close season extends from the 1st May to 1st September, but the Fishery Commissioners have power to alter it; and have exercised such authority in numerous instances. In England, the close season is from 14th May to 4th August, which often proves to be the hottest month of the year. No doubt, the 1st October would, in some ways, be preferable in Canada; but the season, now that winter fishing is prohibited is already so short, lasting a little over two months and a half, that it would seem very hard to further curtail it. If the weather gets warm in the latter end of September, it is the shipper's business to use his judgment in sending oysters to market. That is one great advantage of a person holding a license for an



area of oyster grounds ; he can meet the demands of the market without overstocking it, by sending the best quality and size, leaving his small ones to develop into full-grown oysters.

During the whole inspection, in no single instance have I seen any death or marine enemy to the oyster, which is very remarkable over such an extensive area of ground.

Taking everything into consideration, if care, attention and protection is given to the oyster grounds in the Dominion, oysters ought to be found in all waters so adapted.

I have the honour to be, sir,

Your obedient servant,

ERNEST KEMP,

*Oyster Expert.*